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PR Adsure
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

RG Khandekar
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

PC Mali
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

MV Malshe
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

RV Dhopavkar
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

Corresponding Author:
PR Adsure
College of Horticulture, Dr. B.
S. K. K. V., Dapoli, Ratnagiri,
Maharashtra, India

Assessment of different bioregulators on survival and growth of black pepper cuttings (*Piper nigrum* L.)

PR Adsure, RG Khandekar, PC Mali, MV Malshe and RV Dhopavkar

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Abstract

The present investigation entitled “Assessment of different bioregulators on survival and growth of black pepper cuttings (*Piper nigrum* L.)” was conducted at the Department of Horticulture, College of Horticulture Dapoli, Dist. Ratnagiri during the year 2020-2021. The experiment was conducted in Randomized Block Design (RBD) with seven treatments and three replications. The treatments were T₁ – Vermiwash 15%, T₂ – Vermiwash 20%, T₃ – Vermiwash 25%, T₄ – Cattle urine 5%, T₅ – Cattle urine 7.5%, T₆ – Cattle urine 10%, T₇ – Control (no drenching).

Growth parameters of black pepper cuttings viz. number of days required for initiation of sprouting, number of days required for peak sprouting, number of days required for complete sprouting, length of the shoot, number of leaves, leaf area, girth of sprout, vine length, intermodal length, number of primary roots, root length, number of nodes, dry shoot weight, dry root weight, absolute growth rate, relative growth rate were significantly influenced by bioregulators drenching. In treatment T₂ (Vermiwash 20%) high survival per cent (82.67%), less days required for initiation of sprouting (20.67).

Keywords: Black pepper, survival percentage, days for sprouting, length of shoot

Introduction

Black pepper (*Piper nigrum* L.) is one of the passe spices in the world, belongs to family Piperaceae is originated from Western Ghats of India. Black pepper is usually recognized as Kalimirch in Hindi, Kurumulagu in Tamil, Kurumulaku in Malayalam, Miryalatige in Telugu, Karimenasu in Kannada, Syahmirch in Urdu, Kalomirch in Gujrati, Marich in Sanskrit, and Kali miri or Golmirch in Marathi. In India black pepper was referred as "black gold", due to its high worth as a trade good. Black pepper has been used in different ways in India. There are evidences that it has been associated with Indian cooking since 2000 BC. The primary cultivation of pepper in India was done on the Malabar Coast and repeatedly traded from the Malabar Coast to Middle East, through the Arabian Sea. Black pepper is accounted 35% of the world trade in spices (Ravindran, 2000) ^[12].

Black pepper grows effectively between 20° North and 20° South of equator and elevation up to 1500 m above MSL in humid tropics. Well distributed annual rainfall of 125-200 cm is considered superlative for black pepper. Rainfall after stress induces bounteous flowering. Black pepper does not bear excessive heat and dryness. The crop endures temperature between 100 to 40 °C. The superlative temperature is 23° to 32 °C. Optimal soil temperature for ideal root growth is 26° to 28 °C. It is well grown in heavy clay to light sandy clays rich in humus soils with fragile nature, well drained, but still with abundant water holding capacity. Soils have neutral pH, content high organic matter and high base saturation with Ca and Mg boosted the productivity.

Material and Methods

The experiment was conducted at the Nursery plot No. 4. Under the field of College of Horticulture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyaapeeth, Dapoli.

College of Horticulture, Dapoli, Dist. Ratnagiri in during 2020-21. The experiment was laid out in Randomized Block Design with seven treatments replicated thrice. The treatments applied were T₁ (Vermiwash 15% drenching), T₂ (Vermiwash 20% drenching), T₃ (Vermiwash 25% drenching), T₄ (Cattle urine 5% drenching), T₅ (Cattle urine 7.5% drenching), T₆ (Cattle urine 10% drenching), T₇ (control) Statistical analysis of the data was

collected during the course studies was carried out by standard method of analysis of variance described by Panse and Sukhatme (1995) [13].

Result and Discussion

1) Success percentage

It is observed from Table-1 that there was significant difference among all the treatments during sixth month with highest success (82.67%) in treatments T₂(vermiwash 20%) and T₅ (cattle urine 7.5%) and were at par with treatments T₃ vermiwash 25 per cent (78.00% success) and T₆ i.e cattle urine 10 per cent (76.67% success). The lowest success (68.00%) was observed in T₇ control treatment.

2) Days required for complete sprouting

The data presented on days required for complete sprouting

of black pepper rooted cuttings as influenced by bioregulators treatments after planting of cuttings in polythene bag. It was seen from Table-5 that T₃ (Vermiwash 25%) required less no. of days (52.33) for last sprouting which was at par with treatments T₂ (53.00). The maximum days (57.33) required for last sprouting in T₇ (control).

Length of shoot

It was found that the highest length of shoot (67.51 cm) after sixth month was observed in treatment T₆ (cattle urine 10%) which was significantly superior over all rest of the treatments. Treatments T₂ vermiwash 20 per cent (53.53 cm) and T₃ vermiwash 25 per cent (62.33cm) recorded medium shoot length which are above mean value (52.65). The lowest length of shoot (36.52 cm) of the shoot during sixth month was found in T₇ (control).

Table 1: Effect of bioregulators drenching on success percentage of black pepper rooted cuttings

Treatments	Success (%)					
	30 DAP	60 DAP	90 DAP	120 DAP	150 DAP	180 DAP
T ₁ - Vermiwash 15%	97.33 (80.73)	95.33 (77.83)	90.67 (72.29)	82.67 (65.49)	78.00 (62.07)	75.33 (60.22)
T ₂ - Vermiwash 20%	99.33 (87.29)	98.67 (84.58)	94.67 (77.08)	90.00 (71.62)	84.00 (66.44)	82.67 (65.45)
T ₃ - Vermiwash 25%	99.33 (87.29)	98.00 (81.86)	93.33 (75.07)	83.33 (65.96)	82.67 (65.49)	78.00 (62.08)
T ₄ - Cattle urine 5%	98.00 (83.44)	96.00 (78.71)	90.67 (72.37)	82.67 (65.45)	77.33 (61.58)	74.67 (59.78)
T ₅ - Cattle urine 7.5%	99.33 (87.29)	98.67 (84.58)	95.33 (77.58)	90.67 (72.37)	86.00 (68.06)	82.67 (65.45)
T ₆ - Cattle urine 10%	98.67 (84.58)	97.33 (80.73)	92.67 (74.32)	84.67 (66.95)	80.67 (63.92)	76.67 (61.14)
T ₇ - Control	95.33 (77.58)	93.33 (75.07)	88.00 (69.85)	81.33 (64.44)	76.00 (60.67)	68.67 (55.99)
Mean	98.19	96.76	92.19	85.05	80.67	76.95
S.E. m±	0.79	0.95	1.31	1.77	1.51	1.66
C.D. at 5%	2.43	2.92	4.02	5.45	4.65	5.11
Result	Sig	Sig	Sig	Sig	Sig	Sig

Table-2: Effect of bioregulators drenching on days required for last sprouting in black pepper cuttings

Treatments	Number of Days for complete sprouting
T ₁ - Vermiwash 15%	54.00
T ₂ - Vermiwash 20%	53.00
T ₃ - Vermiwash 25%	52.33
T ₄ - Cattle urine 5%	53.67
T ₅ - Cattle urine 7.5%	56.00
T ₆ - Cattle urine 10%	56.67
T ₇ - Control	57.33
Mean	54.71
S.E. m±	0.32
C.D. at 5%	0.98
Result	Sig

Table 3: Effect of bio regulators drenching on length of shoot of black pepper rooted cuttings

Treatments	Length of shoot (cm)					
	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS	180 DAS
T ₁ - Vermiwash 15%	3.42	10.99	19.31	28.33	39.48	48.53
T ₂ - Vermiwash 20%	4.43	13.18	23.45	32.41	44.45	53.53
T ₃ - Vermiwash 25%	5.41	16.83	27.06	37.17	49.65	62.33
T ₄ - Cattle urine 5%	3.41	10.53	19.49	29.57	38.51	49.47
T ₅ - Cattle urine 7.5%	4.47	14.32	21.54	30.37	39.44	50.67
T ₆ - Cattle urine 10%	5.41	16.33	26.47	38.33	50.25	67.51
T ₇ - Control	2.45	7.31	13.51	22.07	30.42	36.52
Mean	4.14	12.78	21.55	31.18	41.74	52.65
S.E. m±	0.05	0.17	0.18	0.15	0.27	0.18
C.D. at 5%	0.15	0.53	0.55	0.45	0.84	0.55
Result	Sig	Sig	Sig	Sig	Sig	Sig

(DAS – Days after Sprouting)

Conclusion

Thus, from the present investigation, it could be concluded

that drenching of bioregulators at monthly interval from planting of cuttings showed more rapid growth, success and survival of black pepper cuttings. Growth parameters such as length of the shoot, number of leaves, girth of the sprout, leaf area, vine length, internodal length, number of primary roots, root length, number of nodes, dry shoot weight, dry root weight, absolute growth rate, and relative growth rate were improved significantly by all bioregulators concentrations. Similarly requires less days for sprouting by various concentrations as compared to control treatment. Vermiwash drenching at 20% and cattle urine drenching at 7.5% concentration showed the best performance in regards to survival of rooted cuttings, vegetative growth parameters and benefit cost ratio. For the confirmation of results further investigation in this regards is necessary.

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